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ABSTRACT

This activity packet for grade 3 is one of a series developed in response to the concern for energy conservation. It contains activities that stress an energy conservation ethic and includes many values clarification activities for grade three. The packet is divided into two parts and provides the teacher with background information, concepts and objectives, and activities for each part. Two annotated bibliographies, one for teachers and the other for students, are also included. The teacher is provided with ditto and transparency master pages to use in the classroom. An evaluation sheet and a list of resources are also a part of this activity packet. (MA)

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ED146045

ENERGY

Conservation Activity Packet

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Grade 3

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NOTE TO SCHOOLS AND TEACHERS

The filmstrips referred to in the 5th and 6th grade sets can be borrowed from your local AEA. The AEA's have five (5) sets of the filmstrips available. You may wish to make arrangements with them for purchasing a copy of these filmstrips for your own building. The cost was prohibitive for us to include the filmstrips in each packet.

Thank you for your understanding.

ENERGY CONSERVATION ACTIVITY PACKETS

Ruth Bakke
project writer/coordinator

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- Lucretia Smith

Southeast School
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INTRODUCTION TO ENERGY PACKETS

The energy shortages and emergencies with which we are faced attest the treatment humans have given to their natural surroundings. Not only do we experience personal inconveniences but we also see severe economic and environmental consequences. Our nation has arrived at a time when it needs to reevaluate where it is going, at what speed, and how it will eventually arrive at that goal. The National Academy of Sciences generally agrees that the reserves and resources of domestic oil, gas and coal will satisfy energy needs in the United States until the year 2000. Presently the United States doubles its energy consumption every 13 years. In 1975, electric companies burned 507 million barrels of oil to generate electricity, 500 million barrels were burned to heat factories. Much of the oil and natural gas consumed could be replaced by coal, thus drastically reducing oil imports.

The instructional program in a school can examine this energy situation with reason and logic. When a social issue is integrated into the total curriculum, it helps children to apply what they are learning. The educational process can help students become aware of the alternatives and consequences in regard to energy, then guide them to choose a value. Students can learn that it is just as exciting to make something last as it is to develop something new.

Through use of the enclosed materials and activities, it is our intent to stress a conservation ethic. The conservation ethic means more than turning lights off, it has wider implications such as developing new industries to recycle metals, making more durable products, and prioritizing fuel uses.

Our values show what we tend to do with our limited time and energy. They are related to the experiences that shape them. In order to help children develop clearer values, teachers must help them use the process of valuing. Students become much more purposeful when they have been given opportunities to clarify their values.

Each packet contains values clarification exercises designed to carry out the stated objectives. The teacher may wish to use a specific model to develop more exercises. You will find that the valuing process is another tool for the teacher. When used, it leads children from apathy and confusion toward positive learning and life-styles.

The goal of providing the types of activities, which have been included, is to create a growing awareness for the need of dealing with existing energy problems in a positive way. Individual teachers should select objectives which they feel reflect the needs of a particular class. Each packet contains an energy concept and an awareness or accommodation concept. It is imperative to include objectives from each conceptual area as the purpose of these packets is to develop an energy conservation ethic within the students of today that they

may become conserving and concerned citizens of tomorrow. Changes may not occur immediately due to home and parental values; however, as they become adults, this learning will show its effects.

Each packet includes many activities for the teaching towards the stated objectives. Teachers need choose only those activities which they feel will accomplish their objectives. The teaching of energy and its conservation is designed to be interdisciplinary in order that students see that energy cannot be isolated from our daily lives. This is also important in developing the conservation ethic.

Within the packet, teachers will find transparencies, posters, filmstrips, etc. which may add to the teaching of energy and development of conservation. Suggestions and criticisms from teachers, consultants, etc. would be appreciated and considered in keeping these packets suitable for the majority of school systems.

Most young children in the primary grades are within the concrete operational stage, as named by Piaget. They do not have the ability to separate the abstract from something. Therefore, the activities which have been proposed reflect this and provide for greater awareness, rather than a formal study of energy. Individual teachers know their students best and will need to select items which they feel will be of greatest benefit to the education of the children. This is also the reason the concepts and objectives for the primary grades (K-2) have been combined in one packet. There are some classroom activities which require about 20 minutes each, some 40 minutes, and there are also some activities which can be done at home in order to enable children to work with their families.

ENERGY CONSERVATION ACTIVITY PACKETS

GRADE 3

PACKET "A"

TEACHER BACKGROUND MATERIAL
Grade 3 - Packet "A"

How closely is energy related to man and the life he lives? It wasn't long after the 1973 oil embargo that people were colder, gas tanks were more difficult to fill, travel was reduced. Later effects were higher prices, product shortages, unemployment, and depressed industries such as, steel, recreational vehicles, automobiles, clothing, fertilizer, etc. It was during this embargo that everyone became aware that, in addition to food, clothing and shelter, humans also must have energy.

Not only is there difficulty in handling supply and demand, there are also definite threats to the environment. One of the first indicators of extreme stress on the environment was air pollution. The biggest contributor to air pollution is the automobile and second is the fossil fuel generating plants. Water pollution problems indicated that water is a crucial ingredient in the energy web as it is used in washing minerals and in cooling. Energy cannot be studied independently from the environment as they are so closely entwined. Environmental problems also arise when energy is converted to use by humans. In order to convert the stored energy from fossil fuels we burn them. This burning process produces smoke and heat. Heat is a desired product, but there are times when it becomes a waste product and emerges as a pollutant. Nuclear energy, another source of energy, also exhibits environmental hazards: radioactive pollution and radioactive waste storage.

Cities are now warmer than the countryside thus causing changes in rainfall, snowfall, wind speed, etc. Tall buildings act as a heat trap. Most of the extra heat in the cities comes from the sun (almost 3/4 of the extra heat comes from the sun) but it does not have an opportunity to be dissipated by evaporation.

Changes in life-style will need to be made in order to make a change in energy consumption and energy-related environmental problems.

Many of the activities in the 3rd grade packets require between 20 and 40 minutes, depending on length of discussion. Some of the activities are to be done at home and discussed in the classroom.

CONCEPTS AND OBJECTIVES IN ENERGY CONSERVATION

Grade 3 - Packet "A"

Energy

1.00 The learner develops an understanding of how energy affects our lives.

1.1 Becomes aware of the concept of a standard of living and its relationship to energy use.

1.2 Investigates that various energy sources and uses have differing impacts on the environment.

1.3 Discovers that energy is necessary for growth.

1.31 Recognizes that energy is necessary for body growth.

1.32 Recognizes that energy is necessary for industrial growth.

1.4 Becomes aware that food chains or food webs describe the paths by which energy affects all living organisms.

1.5 Sees that utilization of leisure time is dependent upon energy.

Personal Awareness

2.00 The learner will develop an awareness of energy conservation.

2.1 Discovers ways by which energy may be conserved at home, school, community.

2.2 Becomes aware that they can do something to conserve energy.

2.3 Begins to use the decision-making process learned in K-2.

2.4 Develops an idea of the type of life-style desired or denied in consideration of the amount of energy required.

ENERGY ACTIVITIES
Grade 3 - Packet "A"

1.00 The learner develops an understanding of how energy affects our lives.

Standard of Living and Relationships to Energy Use

1.1 Ask the students to think of things they could do that do not require energy. From this simple discussion idea they can be brought to see how energy is an integral part of their lives. Ask what types of energy they used from the time they awoke until they got to school. Role-play, list on board, etc.

1.1 Role-play or have the class write a short play to present how energy is used in a home.

1.1 Divide the class into small groups and tell them to make three lists. One list should include ways in which energy is used in the home, a second list describes ways in which energy is used in the school, and the third list describes ways in which they use energy. *Master #1* could be used for the group. Discuss these lists as an entire class when they are completed and combine into one big list to be posted.

1.1 On sheets of construction paper have the students make a collage of magazine pictures which show the many uses of energy in the U.S. today. These can be displayed for class use or developed into a booklet.

1.1 Take a field trip through a museum and have the students discover the way life-styles have changed and how the amount of energy required has changed with the change of life-styles. Have the children make drawings showing these changes. These can be included in a booklet.

1.1 List the characteristics that distinguish a high standard of living from a low standard of living. If studying people from around the world, or a specific region, compare their standard of living to that in the U.S.

1.1 Use *Data Sheet #1* to list all of the energy users the students personally own or use (such as radios, toys, appliances, etc.). In addition they will also state the type of energy required (such as AC battery, wind-up spring, etc.). Then compare their lists with the items they might own in a nation which uses less energy.

1.1 The students list the electrical appliances in their homes in the order of their importance (cooperate with the family). On the back of the sheet they put the ones they feel could be eliminated without lowering their "quality of existence." (*Data Sheet #2*)

1.1 Ask students to explain why people do not wish to do without those convenience items that consume electricity. They could interview parents, neighbors, etc. to help them in the discussion.

1.1 Show pictures with examples of how energy affects the lives of everyone. Students could make their own slides if the school has cameras you could use. Small groups could be assigned to different areas such as transportation, residential, industrial, commercial, etc.

Impacts on the Environment

1.2 Establish a traffic counting station at an intersection near your school. Divide the class into teams or groups which would observe and count the traffic for 10 minutes at each of three different times during the day for one week. Display the results in chart form, showing the types and numbers of vehicles. (*Data Sheet #3*)

a. At what time of the day was the traffic heaviest and when was it lightest? Why?

b. Were there times when the traffic seemed troublesome?

c. Were there many buses? Should there be more? Why?

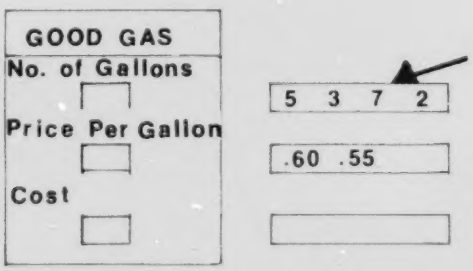
d. Should there be fewer cars? Why?

If it is not possible for your class to spend much time on a project, use similar preparations but have the children make a listing of the first 100 vehicles to pass by their station. (*Data Sheet #4*)

a. How many automobiles had only one person in them?

b. Did many of the vehicles seem to release large amounts of exhaust and fumes?

1.2 As a follow-up, or reinforcement activity, set up a problem solving activity station entitled "Gasoline Station Helper." On a poster board or bulletin board put a facsimile of a gasoline pump. Supply three tagboard strips for the slots on the pump. Groups of two can work out problem solving situations.



1.2 Let the students select various members of the community to interview. In the interview they should find out whether they have experienced energy shortages and what they were. The students could also ask these people what energy they use and how they think it affects the environment. Results of the interviews should then be shared with the entire class and discussed.

1.2, 2.4 List at least five energy sources on which you depend from the time you get up until your class begins. How does this use of energy affect the environment? Attempt to point out specific examples of the affects. The following activity should aid the discussion.

1.2 Show pictures depicting scenes of how energy has an impact on the environment. Teachers may wish to make slides of their own or have the class develop some with local examples.

Energy Is Necessary for Growth

1.3 Plant two terrariums with grass. Place one in the light and one in the dark. After two weeks observe the differences in growth. Don't forget to water your plants! Ask the class what caused the differences. Establish that the sun provides energy for growth.

1.3 The children can chart their food consumption for five days. With the help of a calorie chart they can then calculate their calorie intake. (*Data Sheet #5*) Discuss calories in relation to amount of energy. Do all bodies need the same number of calories? What happens to them?

1.3, 2.4 Take a field trip or write a letter to a local or nearby industrial plant. Find the plant's use per day of electricity and other forms of energy it uses. Discuss the product, its use, and its importance to society. How rapidly has the plant grown and how is energy related to its growth? These questions can be included in your letter or when you visit.

Food Chains and Energy

1.4 Collect pictures from nature magazines and construct a collage illustrating a simple food web. The students should be participants in this process of collecting pictures and constructing a class collage.

1.4 Write an original story which explains what happens to the other members of a food chain when one is removed. Several of these can be shared orally and all can be displayed with the collage from the previous activity.

1.4 If the class has access to a camera, they can take pictures of the members of a food chain in the local environment. These can then be displayed on a bulletin board.

1.4 Discuss *Transparency #2* which depicts the energy path. Let children explain what they observe before giving detailed information. They could then show other energy paths on drawing paper.

Leisure Time and Energy

1.5 Show pictures of leisure time activities. Allow time for discussion about each one to establish the amount of energy involved in each, and energy involved in arriving at the area.

1.5 Collect data on activities various members of the family engage in during leisure time. Use *Data Sheet #6*. What sources of energy are necessary to accomplish each activity? (Include travel to and from, energy required by the person, etc.)

1.5, 2.4 Write stories which would relate events, stories, etc., where you would have a day without electricity. "Describe your day yesterday without electricity." Sharing aloud of these stories would reveal whether there is a good understanding.

2.00 Personal Awareness: The learner will develop an awareness of energy conservation.

Ways to Conserve Energy at Home, School, Community

2.1 Hold an "Absolute Minimum Energy Consumption Day" (AMECD) or "Save Energy Day" for the school. Obtain permission from the principal to announce there will only be cold lunch, no electric clocks, bells, or intercoms, and no electrical audiovisual equipment is to be used. Ask for feelings from the students when the day is over. What did they learn?

2.1 Make posters showing how to save energy. Display these around the school and in windows of local businesses with their permission. Possible ideas: DO NOT WASTE PAPER, WEAR WARM CLOTHES, TURN OFF LIGHTS WHEN YOU LEAVE THE ROOM.

2.1 Students make individual lists of all the things they intend to do in order to save energy in school. These could be in the form of a progress chart with the progress reported daily or they could be in the form of a bulletin board display.

2.1 Stage an "Information Campaign" complete with a slogan contest, poster competition, song contest, outstanding class project, and an energy conservation assembly. Attempt to get newspaper, radio coverage, etc. (The songs are simple to do if you have students select the tune of a simple or popular song such as "Yankee Doodle" or "Twinkle, Twinkle Little Star" then let them make up words about energy to fit.)

2.1, 2.3, 2.4 Bring 10 items such as eggs, milk, lettuce, etc. for the class to put into a refrigerator. Time the duration the refrigerator was open. Then have the class prepare a dinner during which they open the refrigerator each time they need an item. The dinner will be "imaginative" and not really cooked unless the teacher feels it will be more realistic. Time the duration the refrigerator was open during their meal preparation. Help the class realize that by planning and organizing, they can cut the time the door is open, thereby saving energy. Relate this to letting water run while brushing teeth, and other routine activities. There are many things which mother does in the kitchen--watch her method for washing and rinsing dishes, preparing vegetables, cleaning the sink and counters, etc.

2.1 Ask other classes to list ways to save energy and see which class can provide the longest list of ways to save energy at home and school. A certificate could be designed by the children and presented to the winning class.

How Students Can Conserve Energy

2.2, 2.3 Make individual energy conservation report cards which are marked by the child or family each week. Use *Master #3*.

2.2, 2.3 Provide students with a copy of *Master #4*. Ask them to look at the pictures and find the things that are wasting energy. Using a crayon, they should put an x through those things that are wasting energy. Discuss as a class and encourage them to explain how energy could be conserved in that situation, rather than wasted.

2.2 Have the class write and produce a puppet show to tell how to conserve energy in the home, school, and community. This puppet show could be used to help other classes and to get messages of conservation to the public. Check with any local public broadcasting TV station to see whether they would show the puppet presentation, or video tape if possible.

Life-Style and Energy

2.4 Values Voting--Values Clarification Activity

This activity provides a simple and quick method by which the students can publicly affirm their values on issues. Voting is an effective way to introduce values issues into the classroom and to stimulate student interest. Voting lists are not long--up to 10 items. Discussion may or may not follow. The teacher votes too, but holds his or her vote until a split second after most of the students have committed themselves. This is to prevent influencing the vote.

Each question should be prefaced by the statement, "How many of you...?" Any of the items may be opened for discussion and this discussion can be held until interest lags.

How many of you...

1. _____ enjoy watching movies on TV?
2. _____ have read a book just for fun in the last three weeks?
3. _____ play sports activities with your family?
4. _____ have your parents transport you everywhere you have to go?
5. _____ think the energy problems in our country are "made up" by the utility companies?

6. _____think the energy shortages are real?
7. _____have higher utility bills at home?
8. _____think we could help conserve energy by our actions?
9. _____enjoy handmade gifts as much as expensive toys?
10. _____have discussed with your family ways to conserve energy?

2.4 Values Whips--Values Clarification Activity

This procedure provides a simple and rapid means for both the students and teacher to see how others react to various issues or questions. The class should be instructed that their answers are to be brief and to the point. Students may choose to pass. The teacher poses a question to the class and provides a few moments for them to think about their answers. The teacher then whips around the room calling upon students for their answers.

Sample Questions

1. What is one thing you would change about use of energy in your school?
2. What is one thing you would change about use of energy in your home?
3. What is one thing you would change about use of energy in your town?
4. What is one thing you would change about use of energy in your neighborhood?
5. Would you be willing to limit car usage in order to reduce gasoline consumption?
6. What has your family done in order to lower their utility bills?
7. How will you convince someone else about the energy problems and what to do?
8. What is something you have done about the energy issue that you are proud of?

LEARNING STATION ACTIVITIES

If the teacher wishes to use learning stations in teaching about energy, two learning stations could be developed utilizing some of the activities in this packet: Learning Station #1 uses *Masters #5, 6, 7* and Learning Station #2 uses *Masters #8, 9*. The teacher provides copies of the various masters and makes them available with appropriate materials to the students. The individual teacher decides the length of time students should spend at each station.

Energy Activities
Grade 3
Packet "A"
Master #1
1.1

ENERGY IN OUR HOMES

ENERGY IN OUR SCHOOL

WAYS I USE ENERGY

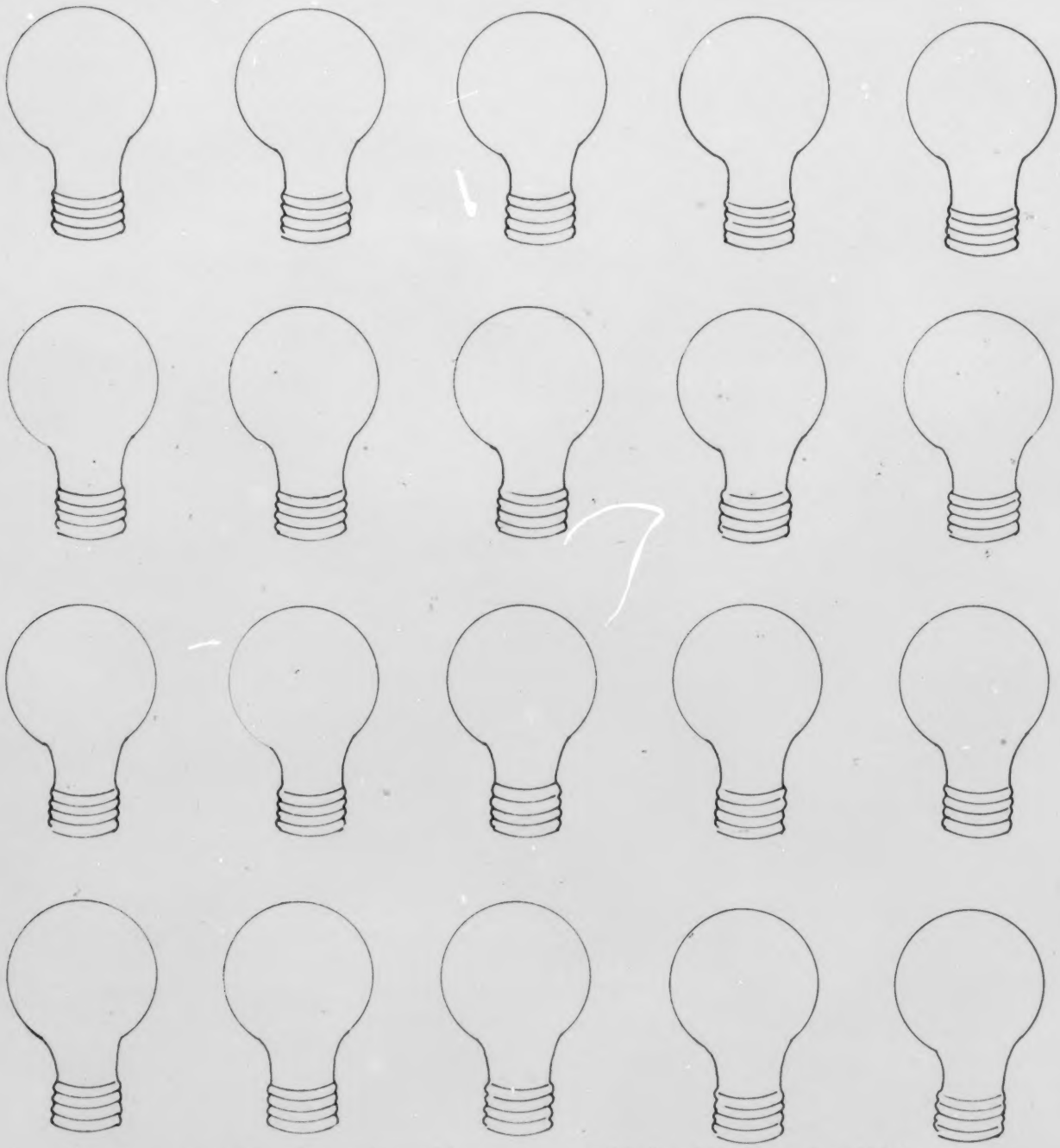
MY ENERGY USERS

	Those I Own or Use	Type of Energy
(example)	1. clock-radio	1. electricity
	2.	2.
	3.	3.
	4.	4.
	5.	5.
	6.	6.
	7.	7.
	8.	8.
	9.	9.
	10.	10.

Energy Activities
Grade 3
Packet "A"
Data Sheet #2
1.1

ELECTRICAL APPLIANCES IN MY HOME

With the help of your family, list all the electrical appliances in your home. Now, go back and number them in the order of their importance to you.



Now put an x through each appliance you could do without and still have a good life.

TRAFFIC SURVEY

	Time _____				Time _____				Time _____			
	Cars	Trucks	Buses	Motor-cycles	Cars	Trucks	Buses	Motor-cycles	Cars	Trucks	Buses	Motor-cycles
Day #1												
Day #2												
Day #3												
Day #4												
Day #5												

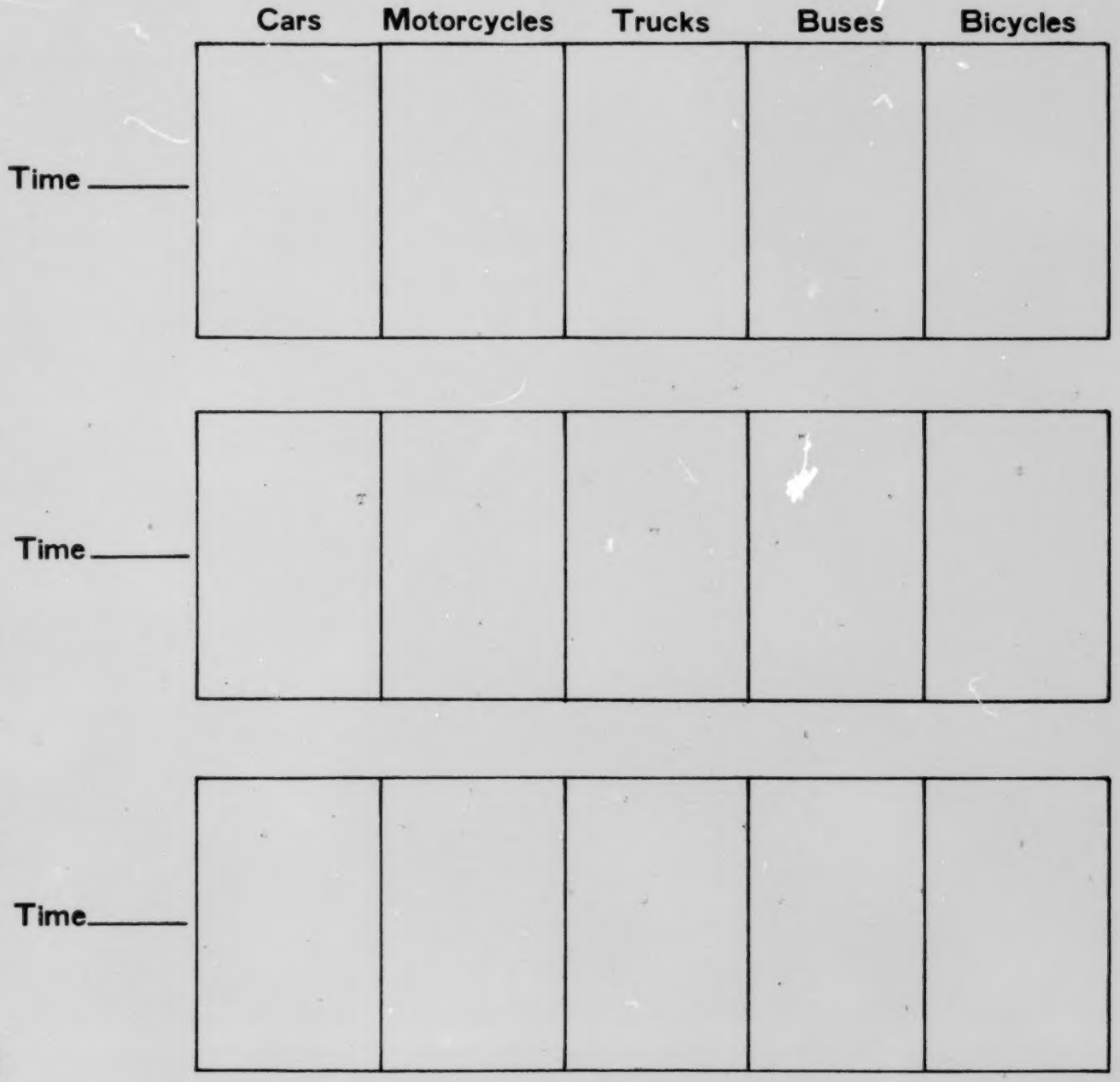
Each time you see a car that has only one person in it, put a check(√) below.

21

14

Energy Activities
Grade 3
Packet "A"
Data Sheet #3
1.2

TRAFFIC SURVEY

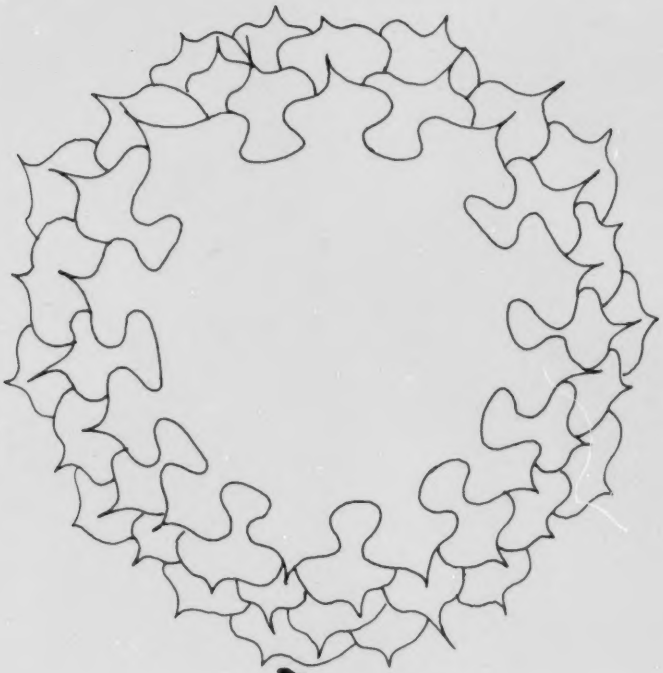


ENERGY FOR GROWTH

List the foods you eat each day. Also include the amounts (1 glass milk, 2 slices bread, 1 bowl cereal, etc.)

	Breakfast	Lunch	Supper	Snacks
Day #1				
Day #2				
Day #3				
Day #4				
Day #5				

Energy Activities
Grade 3
Packet "A"
Transparency #2
1.4



ENERGY PATH

HOW DOES YOUR FAMILY RELAX?

List the activities for each member of your family and tell what sources of energy are needed for each activity. *Use the back for additional brothers and/or sisters.

Example: swimming — body energy (food), gasoline (car), electricity (heated pool, dryer for towels)

Mom

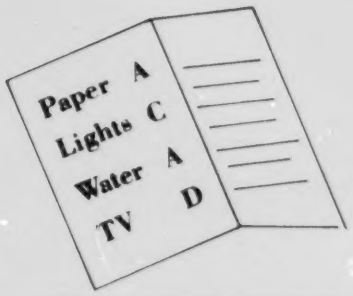
Dad

Brother

Sister

Me

MY ENERGY REPORT CARD



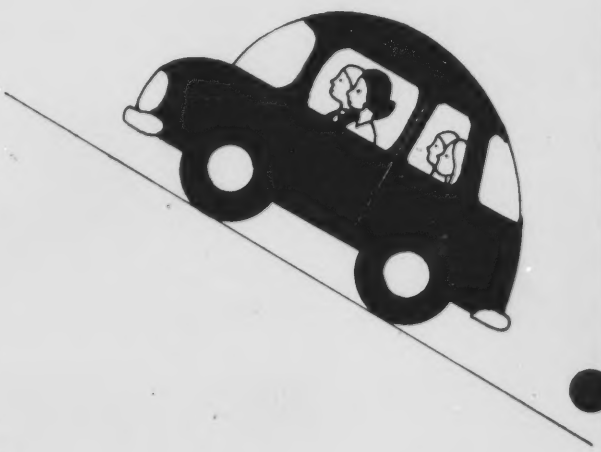
Name _____

Week _____

	Need No Improvement	Need a Little Improvement	Need Lots of Improvement
Ways I Save Energy in School			
• Conserve paper			
• Conserve crayons			
• Conserve pencils			
• Conserve paper towels			
• Turn off lights if not being used			
• Other			
Ways I Save Energy at Home			
• Conserve food			
• Conserve water			
• Conserve _____ (Fill in other items students tend to waste)			
• Turn off lights when not being used			
• Turn off radio and TV when not in use			
• Keep doors and windows closed in cool or cold weather			
• Wear warmer clothes in cold weather so the temperature does not have to be so high			
• Other			

Energy Activities
Grade 3
Packet "A"
Master #4
2.2, 2.3

WHAT IS WASTING ENERGY?



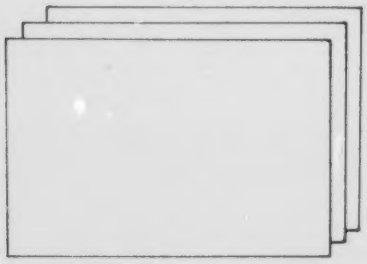
Energy Activities
Grade 3
Packet "A"
Master #5
Learning Station #1

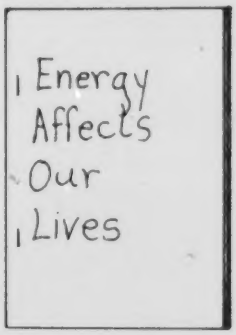
ENERGY AFFECTS OUR LIVES

Materials: sheets of construction paper, glue, scissors, old magazines, catalogs, and advertisements

Make a Booklet!

Use 3 sheets of construction paper to make the booklet.





Staple together

Use the title at the top of this page for the cover of your booklet.

Find pictures which show the many uses of energy in the United States today. Cut them out and glue them into your booklet.

Write your name and the date on your booklet before putting it in the basket on this table!

WHY USE ?

Materials: paper, pencil, tape recorder if you wish

Interview your parents, neighbors, friends!

Think of some questions to ask before you talk to these people. If you are using paper and pencil write down their answers to your questions. If you use the tape recorder just remember to turn it on before you begin talking!

Sample questions

1. Do you have many electrical appliances in your home?
2. Do you use them often?
3. What could you do without?
4. Why don't you want to give up the convenience items that use electricity?
5. What would you do to conserve energy?

Put your paper or tape in the basket when you finish.

Energy Activities
Grade 3
Packet "A"
Master #7
Learning Station #1

IS THERE A SHORTAGE?

Materials: paper, pencil, tape recorder if you wish.

Interview people in the community!

Choose a department store manager, industry foreman, grocery store manager, mayor, and a few others to interview.

Ask these people if they have felt any energy shortages and what these shortages were. Ask them what energy they use and how they think it affects the environment.

Place your paper or tape in the basket when you finish.

MAKE A POSTER

Materials: large sheet of paper, crayons, glue, scissors, paint, chalk, or marking pens, sheet of scrap paper, pencil, ruler, scraps of colored construction paper

1. Use a piece of scrap paper to plan your design showing how to save energy. You may wish to show saving energy in school, in your home, or in your town.
2. Decide whether you will draw and color the picture, or whether you will cut designs out to glue on.
3. Be neat! Keep your poster simple and colorful!
4. Write your name and the date on the back of the poster before you hand it in.

WHAT CAN YOU DO?

Materials: sheet of paper and pencil, stars

On your sheet of paper make a list of all the things you plan to do to save energy in school. You could make it like a chart.

Keep your chart handy and each day for one week put a "*" for each thing you remembered to do and a "-" for each item you did not do.

At the end of the week make certain your name is on the chart and hand it in.

ENERGY CONSERVATION ACTIVITY PACKETS

GRADE 3

PACKET "B"

TEACHER BACKGROUND MATERIAL
Grade 3 - Packet "B"

It is possible that within the next 100 years we will have exhausted the world's supply of fossil fuels except for coal. As fossil fuels rapidly diminish and our rate of energy consumption continues to rise, we will be confronted with a variety of problems. For instance, How will electricity be produced? Should fossil fuel supplies be preserved and utilized in raw materials in the manufacture of clothing, plastics, and medical drugs?

The U.S. has about 1/3 of all the world's coal and it appears to be the answer for the immediate future. However, the fact must be faced that every effort must be made to conserve what we have and develop alternatives such as geothermal, solar, wind, nuclear.

America has been the largest consumer of oil, natural gas, and coal. It is quite an impact to realize that although the U.S. population represents 6% of the world's population, it consumes 1/3 of the world's energy. The U.S. energy supply has been accessible and relatively inexpensive, therefore Americans have taken energy resources for granted and considered them to be inexhaustible.

Americans have had the highest standard of living in the world, money to purchase all the energy they wanted, and live with piles of nonessential energy consuming items. The fact that we have become a mobile nation has also greatly affected our energy consumption and life-style.

Our growing demand for energy has been met by importing more and more petroleum from foreign suppliers. However, there is danger in this dependence on foreign suppliers because the supplying nation can use energy as a political weapon. It is extremely important that the U.S. become energy independent.

Many of the activities in the 3rd grade packets require between 20 and 40 minutes depending upon the length of discussion. Some of the activities are to be done at home and follow-up provided in the classroom.

CONCEPTS AND OBJECTIVES IN ENERGY CONSERVATION

Grade 3 - Packet "B"

Energy

1.00 The learner examines the available energy sources.

1.1 Becomes aware that the location of cities and industries is influenced by access to energy sources.

1.2 Develops map skills by locating current and possible future fuel locations.

1.3 Recognizes that human beings transform and use energy sources to satisfy their wants.

Personal Awareness

2.00 The learner will develop an awareness of energy conservation.

2.1 Discovers ways by which energy may be conserved at home, school, community.

2.2 Becomes aware that they can do something to conserve energy.

2.3 Begins to use the decision-making process learned in K-2.

2.4 Develops an idea of the type of life-style desired or denied in consideration of the amount of energy required.

ENERGY ACTIVITIES
Grade 3 - Packet "B"

1.00 The learner examines the available energy sources.

Location of Cities and Industries Influenced by Energy Sources

1.1 Guide the class in studying (*Transparency #1*) which depicts landforms and use as an overlay transparency, *Transparency #2*, which shows land use (mining, farming, shipping). Discuss the kind of geographical features which are found near economic activity. Also discuss whether certain landforms seem to have more urban development and population. This ties in well with a study of cities.

1.1 Energy Walk

This can be done as part of another field trip or mainly for the purpose of locating where and what kinds of energy are used in your town. Before beginning the walk, review the different forms of energy the community consumes (electricity, wind, moving water, gasoline, etc.). Walk around the town or city and notice where and what kind of energy is used. After returning to the classroom, the children may draw pictures of energy at work as they saw it. *Data Sheet #1* will help the students in gathering information about energy on their trip.

1.1 Energy in _____

Distribute a map of the county, area, or state to the students. On the map children locate their home, school, hospital, local fire department. Then have them list the forms of energy used in home, school, hospital, fire department. Discuss what evidences of energy are found in their neighborhood.

1.1 Compare a settlement of long ago with a city of today. Ask the students how a city becomes a city? This works in very well with a study of cities, population, etc.

1.1 Have students list examples of five forms of energy within the community. Then ask them to explain why these forms of energy are important to the world in which we live. Using one of the forms, let the students explain its origin. Drawings or pictures from magazines could be put together to show how this energy is used.

1.1, 1.3 Invite parents who have jobs related to energy sources to come to class and discuss their work. Other parents could be invited to discuss how they use energy.

Current and Possible Future Fuel Locations

1.2 On a world map, locate important energy fuels and major energy users. This exercise provides practice in interpreting maps and reading them. (*Transparency #3, 4, 5*)

1.2 Locate on a map the countries that have large energy resources and compare them with those countries that use large amounts of energy. (*Transparency #6*) This also provides opportunity in developing map skills.

1.2, 1.3, 2.4 The teacher makes large size copies of the continents, has the children push their desks back against the walls, and lets them place the continent shapes on the floor. Help them discover population for the areas and then assign children to represent population. They could wear colored armbands to represent their area. Then assign fuel to the areas in relation to how much each uses. Those who use the largest amounts of energy can use any of the conveniences in school during the day; those using less would not be allowed to use all conveniences. After one day let them discuss their feelings about energy use.

1.2 Read the class the reprint from Ranger Rick entitled "The Best Present of All." A single copy is available free from the National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036. The class might also enjoy presenting it as a play or a puppet show.

Humans Use Energy to Satisfy Wants

1.3 Provide students with a copy of *Master #1* which is a puzzle in which they find words related to wants, needs, and energy. When they have finished, talk about what is a need, what is a want, and forms or sources of energy.

1.3 The children make a collage of magazine pictures which illustrate the many uses of energy in the United States today that supply or satisfy our wants rather than our needs (dishwasher, electric toothbruch, electric razor, TV, etc.).

1.3 The children write creative stories which tell about what life would be like without a certain kind of energy. (Example: electricity)

1.3 Wastebasket Survey

At the end of a day have the children empty the contents of the wastebasket on newspaper which has been spread. As they go through the contents, have them categorize them into piles--those things that could be used again and those things which cannot be used again. Looking at the pile of things which cannot be used again, ask the children:

a. Did these things provide us with our needs or with our wants?

b. How many of these things could we do without?

c. Can any of these things be recycled--used to make more of the same?

The wastebasket could be checked each day for one week to see if a change is taking place.

1.3 Have the children compare free-time activities of long ago with those of today. Do the free-time activities of today require more energy than those of long ago? Pictures could be made showing the types of activities. Ask the children if these free-time activities are necessary for people or whether they are luxuries.

1.3 In order that students better understand why Americans use so much energy today, provide them with copies of *Master #2*. The students check the boxes of those items which they now have. Then they should take the list home and check with parents and grandparents as to the things they had. These should be returned and discussed.

2.00 Personal Awareness: The learner will develop an awareness of energy conservation.

Ways to Conserve Energy

2.2 Have the children think of things that can be used in place of another, such as: crayon for pencil, chalkboard for paper, broom for vacuum. Use *Data Sheet #2*. It might be interesting to see which student comes up with the longest list.

2.2, 2.4 Tell the children that they may plan to celebrate everybody's birthday but that only one box of birthday candles can be used. They then plan conservation measures so each celebration will be equally nice. This could be planned as a class, groups, or individuals.

2.2, 2.4 Announce that water (or some other item such as paper towels, clay, paper for dittos, etc.) is limited and must be rationed. What you have must last through a certain period of time. Let the class explore ways to live with this and actually have them do it for a week.

2.2 Credit: Environmental Education, K-3 Activities, Division of Science Education, North Carolina State Department of Public Instruction, Raleigh, North Carolina 27611.

After talking about energy conservation, have the children complete sentences such as those on *Master #3*. This would indicate how clearly each student understands the idea of conservation.

Life-Style and Energy

2.3, 2.4 Bring a lollipop and ask the children what would happen to it if you were to take bites out of it. Then ask if there would be any way to make it last longer. Write the word "conserve" on the board and explain that using less of a product, or using another to do the same thing conserves. Then send six children to the chalkboard and pass out three pieces of chalk. Ask if there is enough chalk then ask what the alternatives (choices) would be. After listing several of the alternatives on the chalkboard, ask the children which solution they favor.

2.3, 2.4 Ask the students to describe five ways electric energy has made their life better. Ask whether they would be willing to give up any of their uses of electricity in order to conserve. What would each give up?

2.3, 2.4 Send home a copy of *Master #4* with each student. This letter is designed to initiate family discussions in regards to energy and energy conservation.

2.4 Provide each student with a copy of the Conservation Quiz, *Master #5*. This will provide a means of evaluation for understanding of energy and energy conservation.

2.4 Pattern Search--Values Clarification Activity

Use *Master #6*. This is designed to help students become aware of patterns they have and motives for doing things in a pattern. Once the students have filled in the grid they may then break into small groups and choose one of the items to discuss for 10 minutes. New groups can be organized and a new item discussed. Before letting the students complete the grid on their own, lead them through the first two or three questions. Compulsion can be interpreted for the students as meaning someone makes them do it. It works well as a final activity to have the students look at the last section of the grid where they responded to the question, "Do You Prize Your Answers?," and ask whether they have more checks under yes, no, or ?. Tell them that if they have more under no and ? they should think about their lives more carefully.

2.4 Values Whips--Values Clarification Activity

This procedure provides a simple and rapid means for both the students and teacher to see how others react to various issues or questions. The teacher poses a question to the class and provides a few moments for them to think about their answers. The teacher then whips around the room calling upon students for their answers. The class should be instructed that the answers are to be brief and to the point. Students may choose to pass.

Sample Questions

1. What is something about energy you heard in the news lately that really disturbed you?

2. How much time do you spend worrying about energy and future energy sources?

3. What do you want to do about the energy shortages?

4. What form of energy would you be willing to use instead of natural gas, coal, and petroleum?

5. What is one thing about which you have changed your mind recently?

2.4 Public Interview--Values Clarification Activity

The teacher asks for volunteers who would like to be interviewed about their beliefs, feelings, and actions on energy. The volunteers sit at the teacher's desk or in a chair in front of the room, and the teacher asks the questions from the back of the room. The first few times the teacher reviews the ground rules. If the student answers the question, he must answer honestly. However, the student has the option of passing if he does not wish to answer any one or more of the questions. The student can end the interview at any time by saying, "Thank you for the interview."

Sample Interview Questions

1. Does your family do anything together that is fun?
2. How often does your family do things together?
3. Do you use a lot of energy for your family activities?
4. What did you like about your summer vacation?
5. What could you have done differently in order to conserve energy?
6. Do you and your parents enjoy watching the same TV programs?
7. How much TV do you watch?
8. Do you watch what you want or do your parents decide?
9. What could you do if you could not watch TV?
10. Do you think department stores should be open on Sunday?
11. What have you done to increase an energy shortage?
12. What have you done to conserve energy?

2.4 I Learned Statements--Values Clarification Activity

This activity provides feedback about a specific activity which has been participated in. It helps clarify what the students have learned and also serves as reinforcement. The teacher prepares a chart (use *Chart #1*) with sentence stems and this can be posted permanently in the room or just when it is used. Students are not called on, but volunteer to speak whenever they feel comfortable about it.

It is sometimes helpful the first time around to have students write down a few "I Learned Statements" before sharing them aloud. The teacher could also provide one or two specific examples. Do not allow discussion to interrupt the free flow of statements as it tends to destroy a mood. Attempt to help students focus on personal learnings rather than on general ones. Reassure the students that there are no right answers. Students have the freedom to pass.

Sentence Stems

I learned that I...
I re-learned that I...
I noticed that I...
I discovered that I...
I realized that I...
I was surprised that I...
I was pleased that I...
I was displeased that I...

Energy Activities
Grade 3
Packet "B"
Transparency #1
1.1

1. Anaheim, California
2. Atlanta, Georgia
3. Baltimore, Maryland
4. Boston, Massachusetts
5. Buffalo, New York
6. Chicago, Illinois
7. Cincinnati, Ohio
8. Cleveland, Ohio
9. Dallas, Texas
10. Detroit, Michigan
11. Houston, Texas
12. Kansas City, Missouri
13. Los Angeles, California
14. Milwaukee, Wisconsin
15. Minneapolis, Minnesota
16. New York, New York
17. Newark, New Jersey
18. Paterson, New Jersey
19. Philadelphia, Pennsylvania
20. Pittsburgh, Pennsylvania
21. St. Louis, Missouri
22. San Diego, California
23. San Francisco, California
24. Seattle, Washington
25. Washington, D. C.

Energy Activities
Grade 3
Packet "B"
Transparency #2
1.1

coal

iron

oil

silver

Energy Activities
Grade 3
Packet "B"
Data Sheet #1
1.1

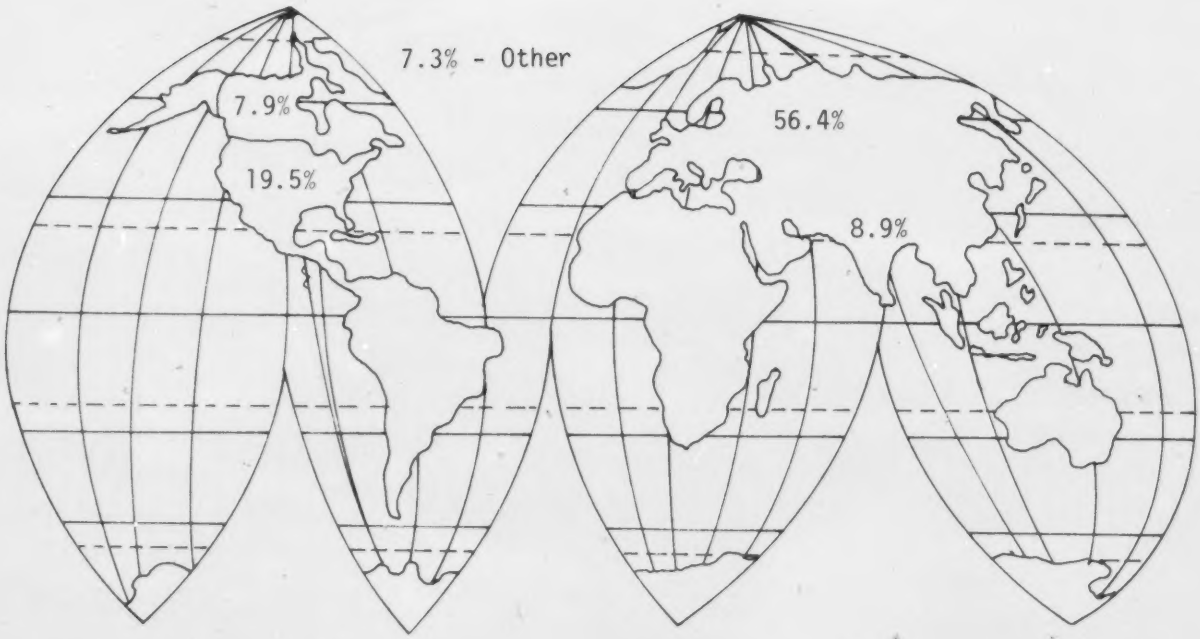
ENERGY WALK

Where I saw ENERGY

What kind of ENERGY I saw

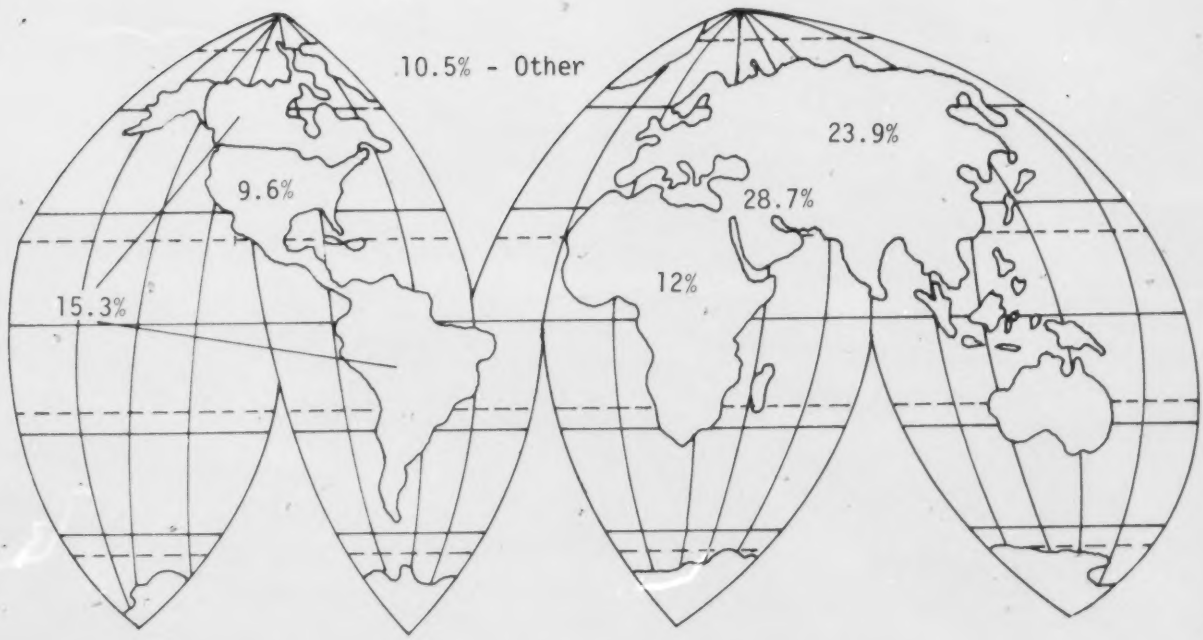
Energy Activities
Grade 3
Packet "B"
Transparency #3
1.2

World Distribution of Coal



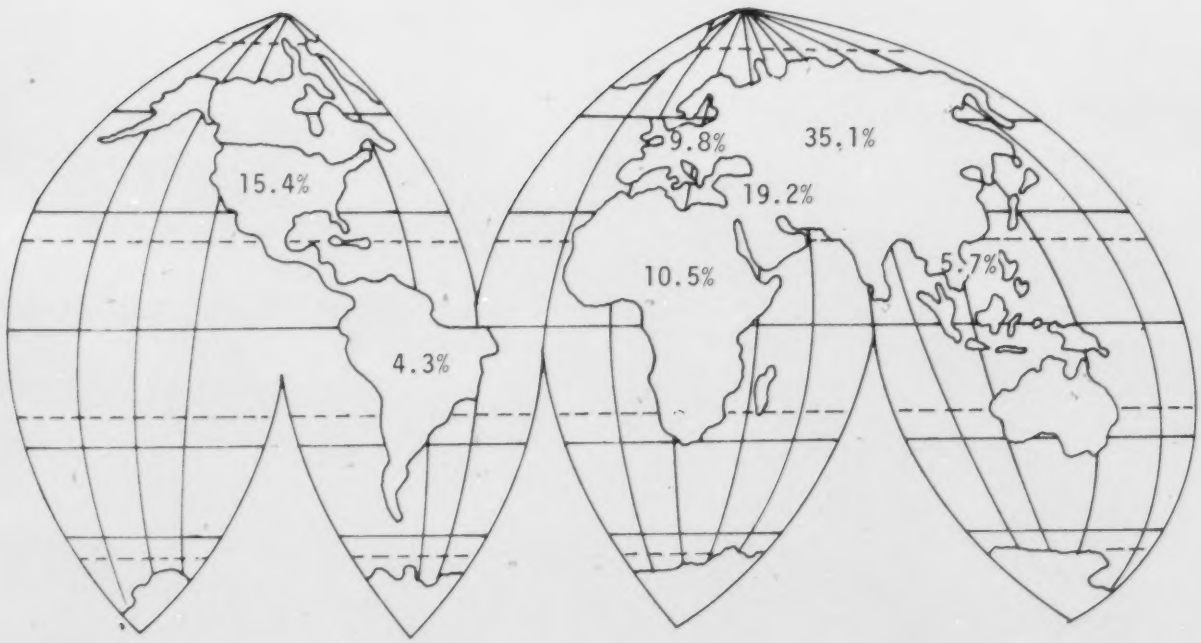
Energy Activities
Grade 3
Packet "B"
Transparency #4
1.2

World Distribution of Oil



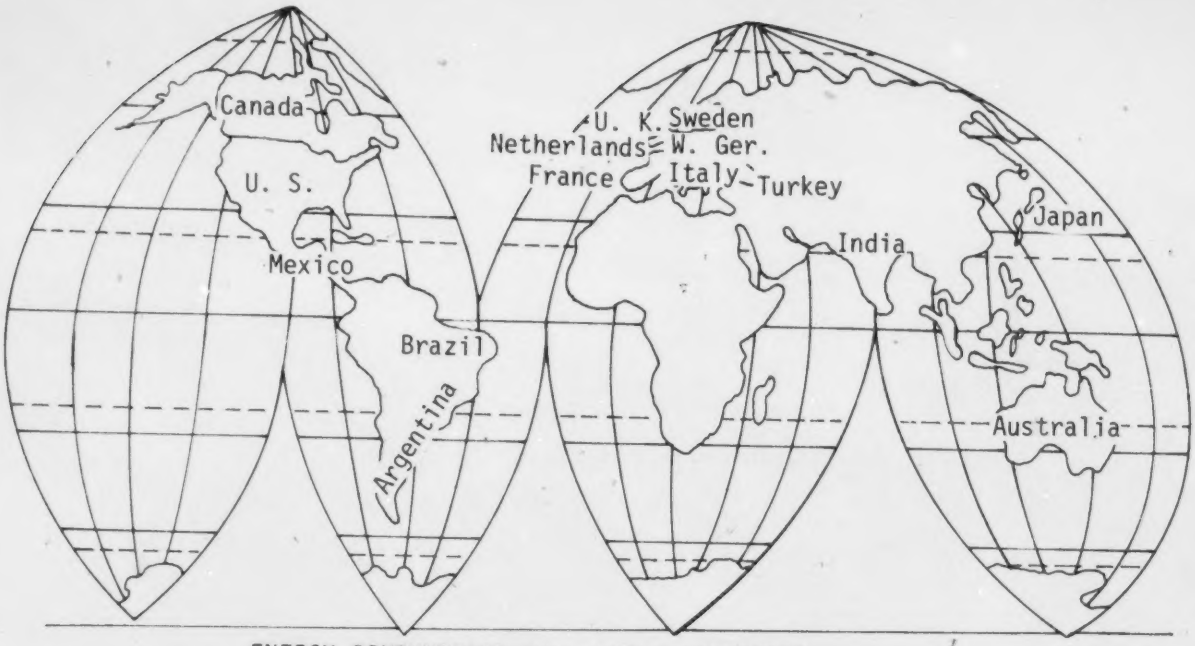
Energy Activities
Grade 3
Packet "B"
Transparency #5
1.2

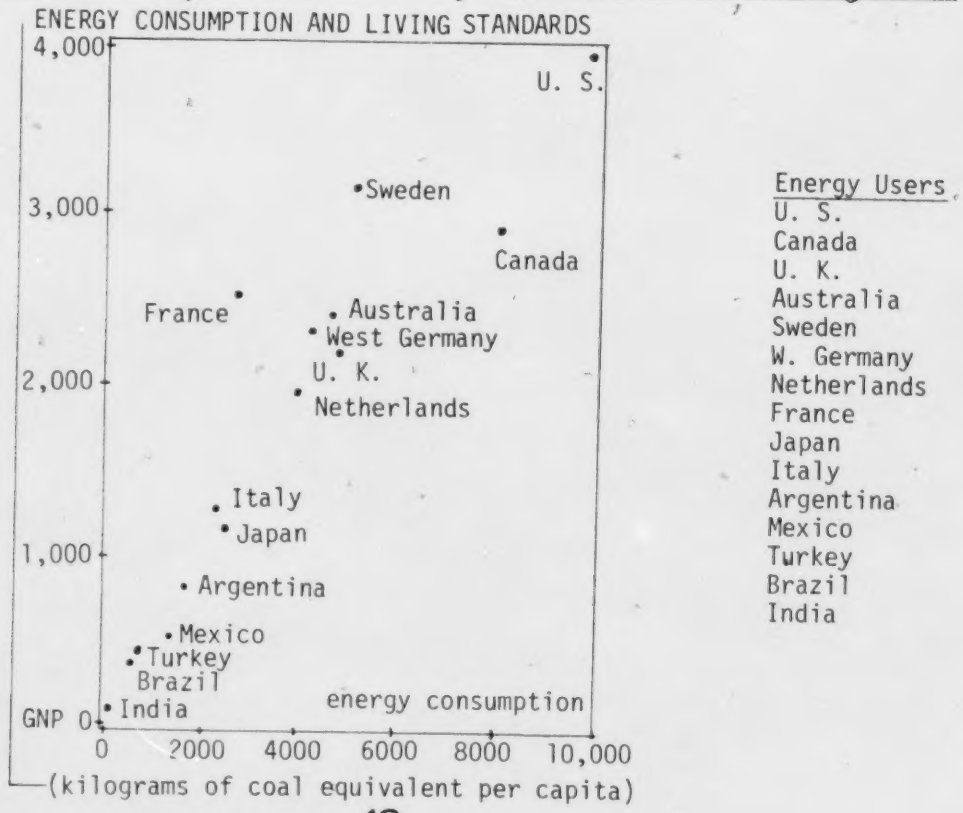
World Distribution of Natural Gas



Energy Activities
Grade 3
Packet "B"
Transparency #6
1.2

ENERGY USERS





Energy Users
U. S.
Canada
U. K.
Australia
Sweden
W. Germany
Netherlands
France
Japan
Italy
Argentina
Mexico
Turkey
Brazil
India

ENERGY PUZZLE

E	L	E	C	T	R	I	C	I	T	Y
Q	E	L	E	C	T	R	I	C	L	F
P	D	D	S	F	G	O	N	A	C	U
S	B	U	O	U	Y	A	C	R	L	R
X	T	E	L	E	V	I	S	I	O	N
W	C	O	D	L	I	B	F	H	C	A
I	O	F	V	U	M	K	O	R	K	C
N	R	B	M	E	S	H	O	E	S	E
D	N	O	I	L	A	Z	D	Q	I	V
M	W	Z	L	C	L	O	T	H	E	S
I	G	A	K	N	Y	L	O	N	S	B
L	A	J	T	F	U	C	A	N	D	Y
L	H	D	X	E	W	Y	L	O	P	A
H	O	U	S	E	R	T	Z	E	S	W

Find these words in the puzzle and circle them.

- stove
- house
- electricity
- television
- clothes
- car
- furnace
- bed
- bicycle
- food
- clock
- nylons
- shoes
- windmill
- water
- electric
- fuel
- gas
- oil
- candy
- milk
- corn

WANTS NEEDS ENERGY

WHY MORE ENERGY?

Now	1940-1945	1915-1920	
☐	☐	☐	TV set
☐	☐	☐	vacuum cleaner
☐	☐	☐	clothes dryer
☐	☐	☐	electric dishwasher
☐	☐	☐	electric toothbrush
☐	☐	☐	radio
☐	☐	☐	electric razor
☐	☐	☐	electric mixer
☐	☐	☐	phonograph
☐	☐	☐	air conditioner
☐	☐	☐	freezer
☐	☐	☐	refrigerator
☐	☐	☐	central heating
☐	☐	☐	automatic washer
☐	☐	☐	electric or gas stove
☐	☐	☐	blender
☐	☐	☐	power mower

ALTERNATIVES

Think of something and then think of what could be used in place of the first item. A few examples are listed.

vacuum	broom
car	bicycle

Energy Activities
Grade 3
Packet "B"
Master #3
2.2

CONSERVATION

Name _____

Sometimes our natural resources begin to get low and we have to replace them with something else or use them wisely. Complete each sentence as completely as you can.

1. To save gas we can _____
2. To conserve electricity we can _____
3. To save paper we can _____
4. To lower our utility bills we can _____
5. To create less waste we can _____

Dear Parents,

Your third graders have been eagerly learning about energy and the ways in which it affects our lives. They have also been trying to learn where the energy sources are located. One of our biggest projects is to learn what we can do to conserve energy and use it more wisely.

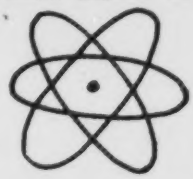
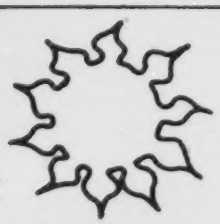
Please use the following questions to begin a family discussion. Your children will enjoy the opportunity of talking with you about what they have learned and ways it will affect their lives. Feel free to add to this list of questions and expand your discussion as the need arises.

Thank you.

1. How does energy affect growth? Our growth? That of our country?
2. How is a food chain concerned with energy?
3. Do we use energy in a way that is harmful to our environment?
4. Will the way we live change if we use less energy?
5. What could we do to use less energy in our leisure time?
6. What are some "wants" we could do without that would conserve energy?
7. Are there ways we can conserve energy at home?
8. What are some ways we could use the car less?
9. Would recycling help to conserve energy? How?

Energy Activities
Grade 3
Packet "B"
Master #5
2.4

CONSERVATION QUIZ

Black and White TV	Room with Thermostat Set at 68° or Below	Car Pool	Do Not Use an Electric Toothbrush	Free Space
Compact Car	 Free Space	Turn Lights Off When Not in Use	Do Not Use an Electric Blanket	Grow a Garden in the Summer
Recycle Papers, Glass, Metals	House with Storm Windows	Fluorescent Lights	Turn Off TV When No One Is Watching	Buy Soft Drinks in Returnable Containers
Hang Clothes Out to Dry	Wash Clothes Once a Week	Ride Bicycle Instead of in the Car	Free Space	Wash Clothes in Cold Water
 Free Space	Wear Warm Clothing in Winter	Have Only One Car	Do Not Use a Snowblower in Winter	Take Vacations Close to Home

Use a yellow crayon to shade in each square that is true for you and your family. How many can you fill in?

PATTERNS GRID

What procedures do you follow about this activity?	Is it a pattern?		Is it done out of			Do you prize feel good about your answers?		
	Yes	No	Compulsion	Habit	Free Choice	Yes	No	???
1. Taking showers or baths?								
2. Using the escalator or stairs?								
3. How you brush your teeth?								
4. Watching movies on TV?								
5. Type of sports activities?								
6. Turning off lights when not in use?								
7. Riding in a car to school?								
8. Using paper wisely?								
9. Using your leisure (free) time?								
10. How high the thermostat in your house is set?								
11. Wearing warm clothes in cold weather?								

Energy Activities
Grade 3
Packet "B"
Master #6
2.4

I learned that I...

I re-learned that I...

I noticed that I...

I discovered that I...

I realized that I...

I was surprised that I...

I was pleased that I...

I was displeased that I...

ANNOTATED CHILDREN'S BIBLIOGRAPHY
Grade 3

BOOKS AND PAMPHLETS

Department of Environmental Quality
Let's Learn About Air Pollution
Department of Environmental Quality: Des Moines, Iowa

Delightful, coloring book format for teaching young children about air pollution and what can be done.

Doty, Roy
Where Are You Going With That Oil?
Doubleday: Garden City, New York, 1976, 48pp., $4.95

Relates to the children that petroleum is not only a fuel and lubricant, but it also is the basis for plastics, fabrics, cosmetics, medicine, etc. There is also a brief discussion of the availability/conservation issue.

Federal Energy Administration
Energy Activities with Energy Ant
GPO, May, 1975, 28pp.

A booklet containing pages to color, along with printed material telling children about energy. In addition, it provides various activities the child can do to review what he understands about energy and how to use it wisely.

Federal Energy Administration
My Energy Book by Energy Ant
GPO, 1976, 29pp.

Colorful and easily read material which gives a comprehensive look at what energy is, sources of energy, uses of energy, and conservation.

Gutnik, Martin J.
Energy--Its Past, Its Present, Its Future
Children's Press: Chicago, 1975

An attractive book for young children giving a brief look at energy sources and the future of our energy resources.

Iowa Power
Penwick
Iowa Power

Intriguing and simple coloring book format to aid young children in understanding what the purpose of insulation is. Includes figures for constructing a mobile.

Moore, Jordan
Energy
Grosset & Dunlap: New York, 1967, 61pp.

Provides examples of many sources of energy and also contains experiments for better understanding of what energy is.

National Wildlife Federation
The Best Present of All
National Wildlife Federation: Washington, D.C.

Comic brochure on energy for children. This is a reprint from the Ranger Rick magazine.

Podendorf, Illa
Things Are Made to Move
Children's Press: Chicago, 1970, $4.50

Book concerns itself with the basics of force and energy.

Podendorf, Illa
The True Book of Energy
Children's Press: Chicago, 1971

Book relates the importance and kinds of energy to children's own experiences. The book contains short sections and many illustrations.

Ruchlis, Hyman
Thank You, Mr. Sun
Harvey House, Publishers: New York, 1966, 45pp.

Provides many illustrations of how the sun helps mankind and nature.

Smaridge, Norah
Only Silly People Waste
Abingdon: Nashville, Tennessee, 1976, 28pp., $4.25

Fourteen silly poems that introduce young children to the importance of conserving energy and materials.

Smith, Norman F.
Sun Power
Coward, McCann & Geoghegan, Inc.: New York, 1976, 46pp., $4.64

Everything that lives and grows on the earth uses energy from the sun. Gives a new understanding and appreciation of the sun, our chief energy source.

ANNOTATED TEACHER'S BIBLIOGRAPHY

BOOKS AND PAMPHLETS

Asimov, Isaac
Electricity and Man
U.S. Atomic Energy Commission
U.S. Government Printing Office, 1974

An informative booklet intended to aid citizens in understanding the vital force of nuclear energy. This and other information booklets, are available for the general public. School and public libraries may obtain a complete set without charge. Available from: USAEC - Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

Asimov, Isaac
Worlds Within Worlds: The Story of Nuclear Energy, Vol. 1, 2, 3
U.S. Energy Research and Development Administration

Three comprehensive booklets including atoms, electricity, and energy showing how man has learned to produce and control nuclear energy.

Cottrell, Frederick W.
Energy and Society: The Relation Between Energy, Social Change, and Economic Development
McGraw, 1955, 330pp., $15.00

Survey which examines the use of energy in low and high energy societies.

Daniels, Farington
Direct Use of the Sun's Energy
Ballantine Books: New York, 1974, 271pp., $1.95

Provides a review of the potential of solar energy and urges additional research. Fun and informative books which could also spark projects and solar experiments.

Energy Research and Development Administration
Creating Energy Choices for the Future
Office of Public Affairs: Washington, D.C. 20545, 1975

A booklet designed to improve the understanding of the U.S. energy policy.

Federal Energy Administration
Organizing School Energy Contests
Washington, D.C. 20461

Helpful brochure encouraging the formation of school energy contests. Guidelines are given as to the processes involved.

Federal Energy Administration
Tips for Energy Savers
Washington, D.C. 20461

Helpful booklet filled with many useful and simple ways to save energy. Designed for individuals and families, but also contains a teaching guide for teachers to help students bring these tips to the concern of the family.

(Ford Foundation Energy Policy Project)
A Time to Choose: America's Energy Future
Ballinger: Massachusetts, 1974, 511pp., $12.95

Final report of a three-year, $4 million study. Reflects the conviction that America can and should have a national energy policy that serves the needs of all people.

Fowler, John W.
Energy - Environment Source Book
National Science Teachers Association, 1975

Designed for teachers who wish to incorporate a study of energy into their teaching. It is divided into two volumes, each with many charts, tables, figures.

Fritsch, Albert J. and others
Energy and Food: Energy Used in Production, Processing, Delivery, and Marketing of Selected Food Items
Center for Science in the Public Interest, 1975, 80pp.

The authors suggest ways to reduce the input of energy in food processing.

Hammond, Allen L., William D. Metz and Thomas H. Maugh II
Energy and the Future
American Association for the Advancement of Science: Washington, D.C., 1973, 184pp., $3.95

Gives an introduction to each of the present and possible future energy sources. It also covers energy conservation and energy policy.

Halacy, D.S., Jr.
Wind, Sun, and Water: Our Energy Alternatives
Harper, 1977, 192pp., $9.95

Easily read. The renewable resources of geothermal, water, tidal, sea thermal energy, wind, biofuels, and solar energy are presented for consideration.

Hayes, Dennis
Energy: The Case for Conservation
Worldwatch Paper, 1976, 77pp.

Review of the economics of energy expenditures and contains many good charts and graphs.

Hodges, Laurent and John Neff
Solar Energy: 1976
Report from the Iowa Energy Policy Council, June, 1976

Descriptive report of some uses to which solar energy is being put and anticipation for further uses.

Iowa State Department of Public Instruction
Energy Conservation in School Facilities

Brochure designed to encourage energy conservation in school facilities. Specific recommendations for reducing energy waste are proposed.

Lapp, Ralph E.
The Nuclear Controversy
Fact Systems: Connecticut, 1974, 93pp.

Especially interesting to foes of nuclear fission.

Lemish, Dr. John
Mineral Deposits of Iowa
Iowa Southern Utilities Company
Craftsman Press, Inc.: Burlington, April, 1969

Excellent resource for Iowa teachers as it is a statement of the mineral deposits and their potentials in the state of Iowa. Some of the information can be condensed and revised for use with upper elementary students.

Miller, Roger LeRoy
The Economics of Energy: What Went Wrong?
Morrow, 1974, 131pp., $4.95

Short review which includes criticism of living the simple life and price controls.

Olin, Dr. Hubert L.
Coal Mining in Iowa
State Mining Board
State of Iowa: Des Moines, Iowa, 1965

Booklet which presents the early history of coal mining in Iowa, its importance as a resource of the state, and its role in the development of Iowa's economy.

Rocks, Lawrence and Richard P. Runyon
The Energy Crisis
Crown: New York, 1972, 189pp., $2.95

Review of sources of energy, impending crisis, resolutions for the problems the U.S. is presently facing.

Simmons, Henry
The Economics of America's Energy Future
U.S. Energy Research and Development Administration, Office of Public Affairs: Washington, D.C. 20545, 1975

Booklet which reviews the role of energy in American life, trends in energy supply, and highlights various forms of energy.

Steinhart, Carol and John Steinhart
The Fires of Culture: Energy Yesterday and Tomorrow
Duxbury, 1974, 273pp., $4.95

A general introduction to energy. Contains material on energy policy, energy and food.

Stolp, Richard N. and Frederick P. Deluca
Perspectives on Iowa Coal
Energy and Mineral Resources Research Institute, Iowa State University: Ames, Iowa 50011, 1976

Colorful and easily understood report on the Iowa Coal Research Project which provides information for interested Iowans.

Swatek, Paul
The User's Guide to the Protection of the Environment
Friends of the Earth, 1970, 305pp.

Paperback which provides specific information on daily decisions which could improve or deteriorate a person's environment. Packaging products, cleansers, energy consumption in the home, are examples of topics the book covers.

Tuthill, Dr. Samuel and Maurice Van Nostrand
Our Energy Needs: Questions and Answers
1973

Very helpful material regarding an energy shortage in the U.S., related in concise form. Helpful to Iowa teachers at all levels.

Udall, Steward and others
The Energy Balloon
McGraw, 1974, 288pp., $7.95

Author urges development of new attitudes and leaner life-styles in order that there will not be as much wastefulness.

U.S. Department of Commerce
Energy: Critical Choices Ahead
Office of Energy Programs, May, 1975

Brochure designed to put the energy problem into perspective and to give indications of the efforts required to meet energy needs.

U.S. Environmental Protection Agency
Questions and Answers About Nuclear Power Plants
U.S. Environmental Protection Agency: Washington, D.C., Revised, 1973

Pamphlet designed to answer many questions which have arisen concerning nuclear power plants and the environment.

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CURRICULUM GUIDES AND RESOURCE BOOKS

American Gas Association, Education Services, 1515 Wilson Boulevard, Arlington, Virginia 22209

Provides many booklets, pamphlets, kits, filmstrip on natural gas. Specifically for grade 5 you may be interested in "Natural Gas Serves Our Community Kit"--N00160 and "Flames and Energy"--N81070.

A Teacher's Introduction to Energy and Energy Conservation
Ohio Department of Education, 1975
Battelle Center for Improved Education, 505 King Avenue, Columbus, Ohio 43201 (ED 127 160)

Guidelines on energy and energy conservation. Provides teacher orientation to energy education and general suggestions for teaching units.

CEL·Blocks
Primary Interdisciplinary Environmental Learning Packets, Brevard County, Florida (ESEA Title III, Project #050-2323-73003)

Student cards covering areas of environmental education which can be used by teachers in a variety of interdisciplinary ways.

Energy
Environmental Education Project, ESEA Title III, Section 306
Topeka Public and Parochial Schools, 1601 Van Buren, Topeka, Kansas 66612 (ED 093 649)

Objectives are listed, along with activities which meet the stated objectives. Teachers select only those appropriate to the objectives for their students.

Energy
Michigan United Conservation Clubs, P.O. Box 30235, Lansing, Michigan 48909

Provides information on the nature of energy, sources and uses of energy, and conservation. There are also some work sheets and ideas for helping others learn more about energy.

Energy
Social Issues Resource Series, Eleanor C. Goldstein, c. 1975.
Social Issues Resource Series, Inc., 1200 Quince Orchard Boulevard, Gaithersburg, Maryland 20760

Notebook filled with reprints of articles related to energy.

The Energy Challenge
Federal Energy Administration
The Energy Challenge, Box 14306, Dayton, Ohio 45414

Twenty-five spirit duplicating activity masters designed for grades 5 through 8. Also contains a teacher's guide section.

Energy Conservation Classroom Kits 1-3, 4-6
Southern California Edison Company, c. 1976
Educational Services, Room 397, P.O. Box 800, Rosemead, California 91770

Colorful kits to help teachers teach about energy conservation. There are folders, inspector cards, stickers, certificates. The teacher's guide contains ideas and lesson plans, in addition to duplicating masters.

The Energy Crisis: What You Can Do About It
Standard Oil Company (Indiana), c. 1973
Mail Code 3705, 200 E. Randolph Drive, Chicago, Illinois 60601

Folder containing four spirit masters and specific teaching instructions. The spirit masters give information and ask for students to supply some interpretation. Parents and other adults are encouraged to participate.

Energy Crisis Teaching Resources
Curry, Wendell, et. al., Oregon State Board of Education, Salem, Oregon, 1973, 59 pp. (ED 085 316)

Many very useful activities to be used in stressing individual responsibility towards energy crisis problems.

Energy - Environment Materials Guide
Kathryn E. Mervine and Rebecca E. Cawley
National Science Teachers Association, Washington, D.C., 1975
(ED 111 663)

Handy source book containing annotated bibliographies for teachers, students, non-print material.

Energy - Environment Mini-Unit Guide
Smith, Stephen M., Editor, c. 1975
National Science Teachers Association, Washington, D.C. (ED 111 664)

Materials designed to stimulate decision making in young children and to make teaching more interdisciplinary. It is filled with many activities and guidelines.

Energy for Today and Tomorrow
San Diego City/County Schools Energy Education Committee
Department of Education, San Diego County, 6401 Linda Vista Road, San Diego, California 92111, 1975

Activities for students in grades kindergarten through six. These help to create an awareness of the need of dealing with energy problems.

Energy and Man's Environment
Jones, John, D.Ed., Editor, 1976
Energy and Man's Environment, Inc., 0224 S.W. Hamilton, Suite 301, Portland, Oregon 97201

Interdisciplinary teacher's guides to energy and environmental activities. Involves 8 books - Activity Guide, Uses of Energy, Sources of Energy, Impacts of Energy, Limits of Energy, Conversion of Energy, Future Sources of Energy, Glossary.

Energy and Man's Environment - Activity Guide
Ris, Thomas F.
Energy and Man's Environment, 2121 Fifth Avenue, Seattle, Washington 98121 (ED 106 070)

Provides educational strategies and materials needed for introducing energy to all grade levels on an interdisciplinary basis. Each chapter has four themes: (1) Scientific, (2) Ethical, (3) Aesthetic, (4) Utilitarian.

Energy Activities for the Classroom - 1976
Coon, Herbert L. and Michele Y. Alexander, 1976
ERIC Center for Science, Mathematics, and Environmental Education College of Education, The Ohio State University, 1200 Chambers Road, Third Floor, Columbus, Ohio 43212

Resource booklet of energy teaching activities divided into grade levels: K-3, 4-6, 7-9, 10-12.

Environmental Education: Strategies for Wise Use of Energy
Division of Science Education, North Carolina Department of Public Instruction, Raleigh, North Carolina 27611, c. 1974

Designed for use at all grade levels, therefore, activities are grouped K-3, 4-6, 7-12. An appendix contains charts, glossary, bibliography, checklists.

Fun With the Environment
Environmental Protection Agency
Washington, D.C., 1973, 20pp. (ED 103 213)

Activity booklet which helps young children learn about their environment. The booklet has a cartoon and coloring book format.

Heirarchy Chart
John Muir Institute for Environmental Studies, Inc., 2118-C Vine Street, Berkeley, California 94709

Comprehensive total concept chart which was to be used in developing environmental studies curricula to supplement existing K-12 programs.

Living Within Our Means: Energy and Scarcity
Environmental Educational Instructional Activities K-6
The University of the State of New York, The State Education Department, Albany, New York 12234

Instructional manual which illustrates ways in which environmental concerns may be integrated into the curriculum. Excellent activities arranged according to disciplines.

"Mickey Mouse and Goofy Explore Energy"
Walt Disney Productions, 1976
Public Affairs Department, EXXON, U.S.A.
P.O. Box 2180, Houston, Texas 77001

Very comprehensive, yet delightfully presented energy comic book. Copies are available from the above address. Covers previous sources of energy and possible future sources.

My Energy is Your Energy
Arizona Department of Education, February, 1974

Resource book and conservation activities designed for K-12.

Nuclear Power - Meeting a Need a New Way
Cedar Rapids Community Schools, 346 2nd Avenue, S.W., Cedar Rapids, Iowa 52404, c. 1972

Provides good suggestions as to teaching about nuclear power.

Student Learning Activity Module "The Energy Crisis"
Hughes, Judi and Lee County Environmental Education Program
Title III ESEA, 2266 Second Street, Fort Myers, Florida

Contains lesson plans, resource materials, and a Student Teaching Module on energy. Developed to help create an awareness of the causes, and some solutions for the energy crisis the world is facing.

Teacher's Handbook of Energy
Colorado Department of Education, Denver, Colorado 80023, c. 1974
(ED 119 957)

Provides teachers with information on energy and instructional activity suggestions.

Ways to Environmental Education, Volume III
Allen, Rodney F., Ed. and Others
Florida State University, Tallahassee College of Education, Tallahassee Junior Museum, Florida, 1975, 150pp.

Ten environmental booklets in one volume. One booklet covers energy learning activities for camp and home.

Wide World of Energy Kit
Walt Disney Productions, 1976
Walt Disney Educational Media Company, 500 South Buena Vista Street, Burbank, California 91521

Kit contains cassette and color filmstrip titled, "The Search for Power and Energy;" 18 full-color study prints; Energy Game; 30 copies of the energy comic book, "Mickey Mouse and Goofy Explore Energy;" 10 energy activity cards; teacher's guide with information and additional activities.

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EDUCATIONAL JOURNAL ARTICLES

Asimov, Isaac
"The Fascinating Story of Fossil Fuel"
National Wildlife
Vol. 11, November 5, August-September, 1973

Colorful charts could be helpful material for teachers.

"Energy Consumers Turn into Conservationists"
Nation's Schools
93: 4: 26-28, April, 1974

Describes how the topic of energy conservation has been introduced into school curriculums. Salem, Oregon; Marshalltown, Iowa; Des Moines, Iowa; Buckingham, Pennsylvania are mentioned specifically.

Fowler, John M.
"Does the Energy Theme Belong in the Classroom?"
Today's Education
65: 88-9, March, 1976

Teachers are encouraged to put more emphasis on energy education in the schools. Suggestions are given to make it interdisciplinary and goals are stated which aim to prepare the "students of today - citizens of tomorrow" for life.

Fowler, John M.
"Energy, Education, and the 'Wolf' Criers"
Social Education
pp. 245-256, April, 1976

Examines the background to the current energy crisis and outlines some possible solutions to the problems.

Glickman, L. J.
"Teaching Guide on Energy"
American Education
11: 40, June, 1975

Reviews an informative handbook entitled Energy Crisis Teaching Resources: A Special Publication Suggesting School Activities Which Stress Individual Responsibility Towards Energy Crisis Problems which was initially written for Oregon's Energy Crisis Week (December, 1973).

Hankla, Alice Kimbler
"An Energy Conference for Little People"
Science and Children
Vol. 12, No. 7, pp. 5-7, April, 1975

Reviews a conference which was held for children ages 4 and 5 at which they learned what energy is, how it works, and devised methods of energy conservation.

Harder, Peter J.
"Activity Cards Bridge Science and Social Studies"
Science and Children
Vol. 12, No. 7, pp. 8-10, April, 1975

Utilizing photography, the author developed a series of local photos to be made into activity cards with the questions on the back. Several different approaches to using the cards were suggested.

Hawkins, M. E.
"Energy: Future Alternatives and Risks"
Science Teacher
41: 25-7, April, 1974

Review of a two-day Academy Forum on Energy sponsored by the National Academy of Sciences. The Forum took up six propositions regarding energy. Many ideas were brought before the assembly.

Johnson, W. A.
"Energy Cricis: Not Only Why But What Can We Do?"
NASSP Bulletin
58: 28-36, May, 1974

Author expresses that the reason the U.S. is a nation of energy spendthrifts is that we have been paying far too little for the energy we use. Feels that a rise in prices will provide the incentive for conservation.

Kenick, L. E.
"Energy Teaching Centers"
Science Teacher
43: 34-5, May, 1976

Author proposes setting up Energy Teaching Centers within a community for school children, parents and homeowners, and teachers. These centers would provide means for the local population to explore and encounter energy alternatives.

Kirman, J. M. and M. A. Nay
"Joint Planning for Integrating Social Studies and Science: Teaching About the Energy Crisis"
Social Education
39: 77-80, February, 1975

The authors express the hope that by encouraging the integration of social studies and science, schools will begin the process of providing an integrated curriculum.

Messer, Melanie B.
"Energy for Today and Tomorrow with Energy Eagle"
Science and Children
Vol. 14, No. 3, pp. 18-20, November/December, 1976

Delightful energy awareness activities produced by the San Diego County Department of Education for use with elementary students. Teachers are encouraged to adapt these to their own local situations.

Nesbitt, William A.
"The Energy Question: Problems and Alternatives"
Intercom
pp. 12-16, September, 1973

Proposes some ideas for teaching about the energy questions, charts, background information and data, and some suggested solutions with both the advantages and disadvantages.

Post, T. R.
"Energy Crisis: An Opportunity for Meaningful Arithmetical Excursions"
Arithmetic Teacher
22: 61-4, January, 1975

Suggests math activities which provide meaningful situations. Emphasis is to help students become sensitive to the implications a national crisis could bring.

Sartwell, J. G. and R. P. Abell
"Teacher's Guide to the Energy Crisis"
Today's Education
64: 90-7, January, 1975

Authors present facts about energy use, questions for students and teachers, alternative sources of energy, ideas for classroom use, and resources which are available.

Sommerkamp, P.
"Energy Crisis Gameboard"
Science Teacher
42: 39-40, June, 1975

Describes a game devised by students in Kentucky as a result of their study of energy. There are two versions - one without cards and one with cards.

"Starting Points - Energy: Plugging into the Fuel Crisis"
Learning
Vol. 2, No. 4, December, 1973

Aimed at teachers of K-8. Contains a series of activities to help students understand what energy is, as it flows through our life.

Yant, S. L.
"Facing the Energy Crisis in a Mathematics Classroom"
Arithmetic Teacher
23: 223-4, March, 1976

Teacher relates specifics of an eight-day project within a math class that created practical applications to the energy crisis.

ANNOTATED TEACHER'S BIBLIOGRAPHY

MULTI-MEDIA MATERIALS

"The American Dream is Running Out of Fuel"
18 minutes, color, $230 or $19-rent (Gr. 5-8)
Films, Inc.
1144 Wilmette Avenue
Wilmette, Illinois 60091

"Bate's Car: Sweet as a Nut"
16 minutes, 16mm, color, $230 or $30-rent, 1975 (Gr. 5-12)
Arthur Mokin Productions
17 W. 60th Street
New York, New York 10023

Presents the inventor's energy-saving inventions, particularly his methane-driven automobile. Highly recommended by AAAS.

"Coalmining: The Story of Buried Sunlight"

Filmstrip, elementary

Ecology Activity Cards
BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

Some of the activities related specifically to energy. Others in the box guide the children towards conservation and the idea of using our resources wisely.

Ecology: Understanding the Crisis
Series No. 6454, c. 1972
Encyclopaedia Britannica Educational Corporation
425 North Michigan Avenue
Chicago, Illinois 60611

Filmstrip, records, guides. General coverage of what has caused the crisis, how man relates to his environment, a look into the future.

"The Economics of the Energy Problem"
Economic Topic Series
Teaching Resource Films, 1976

Sound filmstrip. Provides a basic overview of the energy problem.

"Electricity"
Community Series: Systems in Our City

Elementary level filmstrip.

"Electricity from Heat and Sunlight"
8mm film loop, color, with teacher's guide, $23.50 (Gr. 4-12)
Doubleday Multimedia

Shows how electricity can be produced from heat and sunlight.

"Energy"
Iowa Petroleum Committee

"Energy: A First Film"
8 minutes, sound, color (Gr. K-3)
BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

"Energy: Ability to Do Work"
9 minutes, color, sound (Gr. 5-8)
AIMS Instructional Media Service
P.O. Box 1010
Hollywood, California 90028

"Energy and Power - A First Look"
10 minutes, 16mm, 1962 (Primary - Intermediate)
Journal Films

Outlines, from the days of the caveman to the present, many ways in which man harnesses energy and increases his capacity to do work by utilizing the potential energy found in wood, wind, and running water.

"The Energy Challenge" - Kit, c. 1975
Pollution Control Education Center
Township of Union Public Schools
Union, New Jersey

Grade level undesignated, however, could be used in Gr. 6 with some modification and for the junior high. Contains student booklets, teacher's guide, two filmstrips with cassette, duplicating masters, activity cards, and overhead transparencies.

"Energy Crisis"
13 minutes, 16mm, color, 1972 (Gr. 4-9)
Journal Films

Reviews the different energy sources and indicates the length of time we may be able to depend on them. Shows the possibility of solutions and developments which may some day provide unlimited power to meet our needs.

"Energy Crisis Game," 1973 (Upper elementary and junior high)
Intemation, Inc.
New York, New York 10001

For 2-6 players.

"Energy Game"
Northern Natural Gas"

Twenty minute slide and sound show followed by a quiz, designed for grades 4-6. The stress is upon energy conservation with a short review of where energy comes from.

"Energy With a Capital C - for Conservation"
Energy Policy Council
707 East Locust
Des Moines, Iowa 50319

Slide presentation complete with slides, audience pamphlets, and a recorded cassette of the slide narrative.

"First Film on the Wind"
9 minutes, 16mm, color, sound, c. 1966 (Elementary)
BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

Shows how, though one cannot see the wind, he can see what the wind does, such as making waves on the water, swaying trees, and lifting kites. Shows how rain clouds come and go with the wind.

"Global Emergency: Energy"
Guidance Associates, c. 1975 (Gr. 6)

Two sound filmstrips, "New Sources, New Values" and "The Energy-Aware Society," which deal with the various alternative sources of energy. It also looks at the social, economic, and political problems in our world of shortages. The students also look at alternative life-styles.

"The Great Search: Man's Need for Power and Energy"
13 minutes, 16mm, color, with teacher's guide, 1972 (Gr. 4-up)
Walt Disney Production

Traces history of man's attempts to harness energy of sun, water, lightning, etc. in order to produce power needed for daily living.

"Man's Search for Energy"
Filmstrip, 36 frames, $6.75 (Gr. 5-8)
McGraw-Hill Films
1220 Avenue of the Americas
New York, New York 10020

"Our Energy-Based Economy"
EEI Pub. No. 74-54
Edison Electric Institute

A multi-media instructional program for Gr. 6-8. Contains four filmstrips, four records, duplicating activity sheets, duplicating pre/post assessment sheets, and a teacher's guide.

"Our Energy Supply"
Part of The Only World We Have Series (Gr. 6)
Narrated by Dr. Leonard Reiffel and Miss Moones, Bell and Howell

Twenty minutes, two-part tape. Presents a wide variety of the problems relating to our energy usage. Covers definition of energy, present sources, explains origin of our energy problem, possible energy sources.

"The Petrified River"

Film available from Iowa Electric Light Company.

"Power"
Color filmstrip, 53 frames. Sound with cassette or record. (Intermediate - Junior High)
From Water and How We Use It Series, 1971
6 filmstrips with cassettes, $70.00; with records, $55.00
Coronet Instructional Films

Shows how water power helped the development of early industry and how water supplies power for hydroelectric energy from the water and how we use it.

"Power and Energy"
Set of two filmstrips, record or cassette, automatic and manual, $25.00 per set
18-20 minutes, color, 50-59 frames, with teacher's guide (Gr. 5-9)
Educational Activities

Answers such questions as: Where does energy come from? How is it produced and distributed? Why are there "Brown-outs?" How do you produce power from fossil fuels, fission, fuel cells, ocean, solar energy?

"A Practical Guide to the Energy Crisis," 1975
Schloat Productions Distribution Center
West Nyack, New York 10994

Two excellent color filmstrips, two records or cassettes. Part One: "Reasons for the Crisis," 89 frames, 10 minutes. Part Two: "Responding to the Crisis," 78 frames, 11 minutes. (Gr. 6-8)

"Science and Society: An Inquiry Into Technology and Values: Energy," 1975
Schloat Productions Distribution Center
West Nyack, New York 10994

Excellent sound filmstrip program containing two filmstrips with cassettes. Filmstrip I - "Power Struggle," 101 ft., 19 minutes. Filmstrip II - "Future Power," 103 ft., 19 minutes. (Gr. 6-8)

"This Earth: Everything Fits Together," 1973
Guidance Associates

Multi-media learning experience for the elementary years. Children see that everything is interdependent and that the sun is the energy source for all life on earth. Sound filmstrips, study cards, poster, game poster, stencils, work sheets, and teacher's guide.

"The World of Energy"
Filmstrip (Gr. 5-8)
National Geographic Society
Department 1037
Washington, D.C. 20036

TEACHER'S RESOURCE LIST

In addition to those listed below, specific suggestions are also included within the packets with the activities.

1. AEA - Area Education Agency

   Check their film and book catalogs and any other material they have available.

2. Chamber of Commerce

   Contact for help in locating local solar buildings and homes, industries which may be cooperative, etc.

3. C.U.R.E. (Citizens United for Responsible Energy)
   1342 30th Street
   Des Moines, Iowa 50311 (515/277-0253)

   Contact for information and speakers.

4. Iowa Energy Policy Council
   707 East Locust
   Des Moines, Iowa 50309 (515/281-4420)

   Contact for information and speakers.

5. School custodian.

6. Utility and Power Companies.

WILL YOU HELP US?

Use the following space for suggestions, criticisms, or comments. We welcome any contribution you may wish to make. Please send these to Duane Toomsen, Environmental Education Consultant, Curriculum Division, Department of Public Instruction, Grimes State Office Building, Des Moines, Iowa 50319.

Name _____

Address _____

City _____ State _____ Zip _____

School _____ Grade _____

How did you use the Packet?

Was it relatively easy to integrate the activities into existing studies?

What were your feelings about the values activities?

How could the packets be improved?